

Low Pressure Fuel Evaporative Testing Workshop

Bureau of Automotive Repair
&
California Air Resources Board

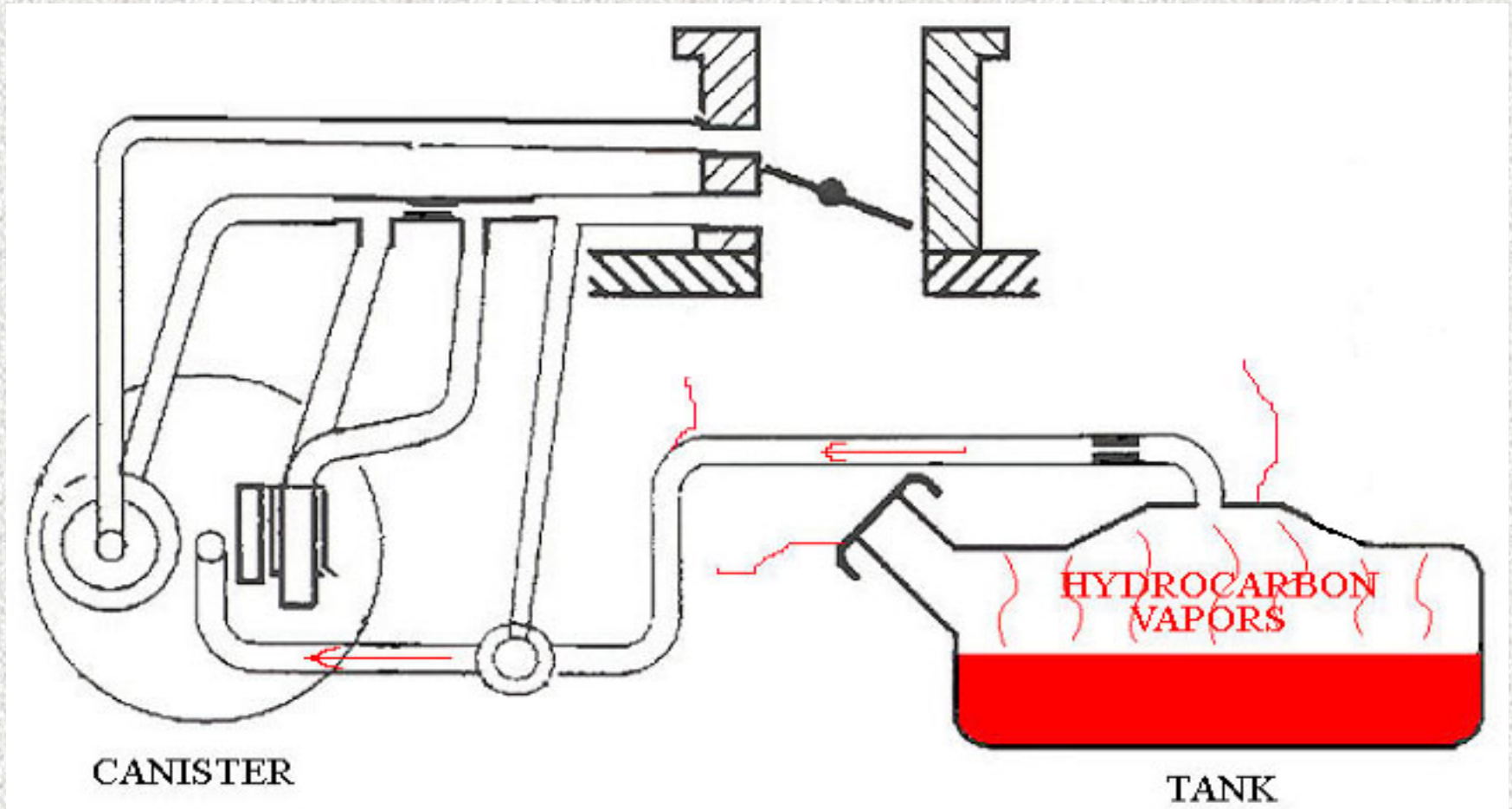
April 2006

Introduction

(ARB staff)

- Evaporative Emissions
- Need for a Low Pressure Evaporative Test
- Benefits

What Are Evaporative Emissions?



Purge Side (Repair Inspection)

Tank Test (Pressure Side)

Example of Fuel Tank Leak

(photo from repair study)

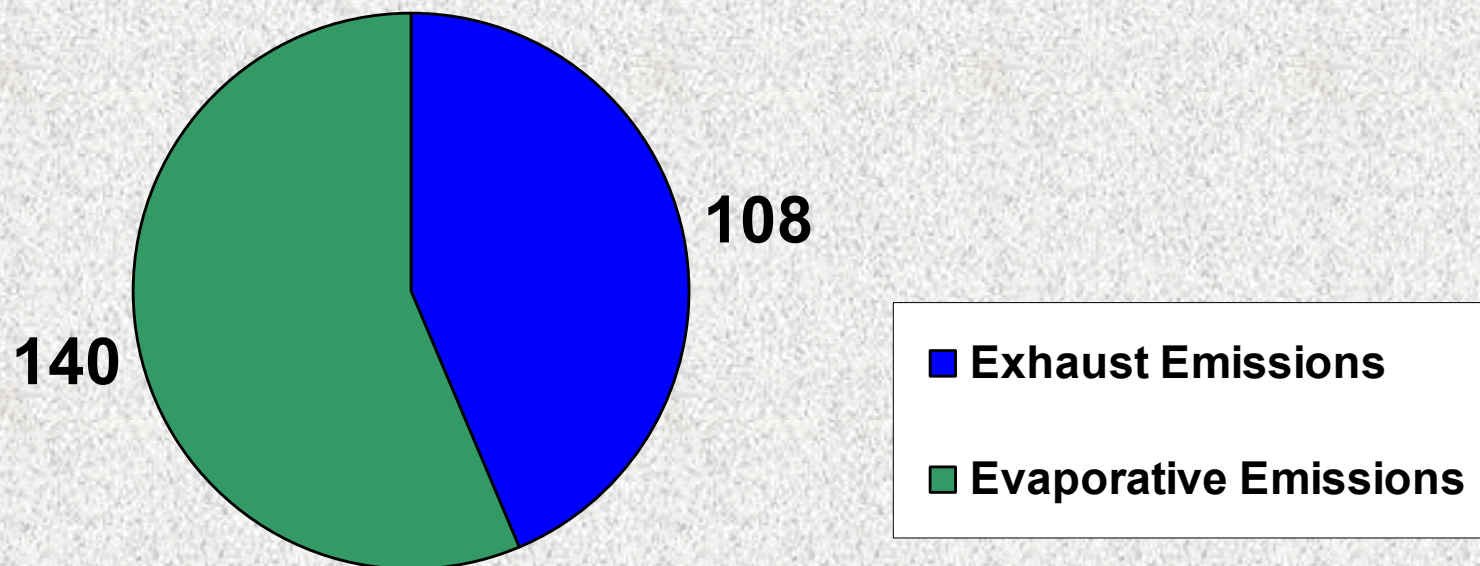


Pressure test can identify potential liquid leaks

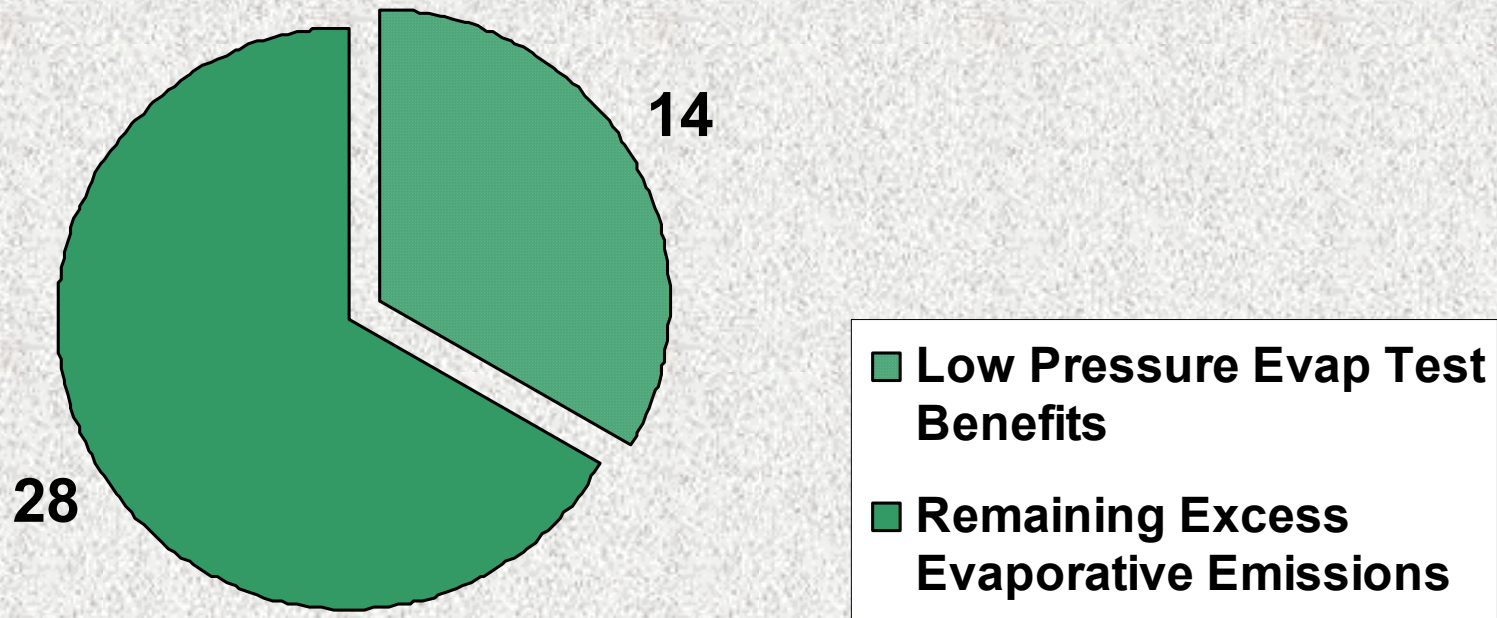
Light Duty Vehicle Hydrocarbon Emissions

Calendar Year 2010, Model Years 1976-1995

Tons per Day with Current I/M Program



Excess LDV Evaporative Hydrocarbons Calendar Year 2010, Model Years 1976-1995 Tons per Day



Health Impacts

- Ozone exposure aggravates asthma and causes long-term lung damage to children
- Cardiovascular and immune system function decrease during smog episodes
- Benzene from gasoline vapor is a major source of airborne cancer risk
 - 240 excess cancer cases per million people in 2003

The Need for Low Pressure Testing

- Californians breathe too much unhealthy air
 - Fuel vapors are major source of reactive hydrocarbons, a key ingredient in smog
- ARB & BAR committed to U.S. EPA to implement low pressure evaporative system testing in California
 - Last unfulfilled commitment in August 17, 2000 letter to U.S. EPA pledging smog check program improvements
- Failure to implement jeopardizes \$2.5 billion in transportation funding due to federal conformity rules
- Included in EPA's Enhanced Smog Check Performance Standard

Benefits

- Projected reductions 14 tons per day statewide
- \$6688 per ton cost effectiveness is favorable (e.g., Moyer program threshold \$14,300)
- Increased liquid leak identification (source of gross evaporative emissions)
- Prevention of fuel related hazards
- Reduction of air toxics, especially Benzene
- Reduced VOC Infiltration from attached garages
- Fuel Savings to Consumers

Introduction

(BAR staff)

- BAR
 - Current Testing
 - Proposed Testing
 - Test Procedure
 - Fact Sheet
 - What Happens Next

Current Evaporative Testing

- Evaporative system visual inspection
- Fuel cap testing
- Liquid leak check
- OBD II implementation

Proposed Low-Pressure Fuel Evaporative Testing (LPFET)

- Overview
 - 1976-1995 vehicles, statewide
 - Functional test of fuel tank and vapor lines:
 - Pressurize evaporative system at filler neck
 - Assess Pass/Fail at 0.040 inch equivalent leak size
 - Estimate leak size, if any, accounting for vapor space, vapor pressure

Test Video

Leak Detection / Test Procedure

- Enter limited vehicle information
- Install filler neck adapter and pressure hose
- Pinch / seal line near canister
- Run test
- If fail, verify seal as directed, perform retest
- Remove tester and pliers
- Enter result into BAR-97

Demonstration

- Device Overview
- Electronic Pinch Point Locator
- Equipment Available for Hands On
- Manual Mode Video

Systech Low Pressure Fuel Evaporative Tester (LPFET)



ESP/Waekon Low Pressure Fuel Evaporative Tester (LPFET)



Screen Shot - Electronic Pinch Point Database

Evap Locator

Select Vehicle

Make: Chevrolet Year: 1987

All makes
Acura
Alfa Romeo
Audi
Bentley
BMW
Buick
Cadillac
Chevrolet


1984
1985
1986
1987
1988
1989
1990
1991
1992

View Results

1987 Chevrolet Astro
1987 Chevrolet Beretta
1987 Chevrolet Blazer
1987 Chevrolet Camaro
1987 Chevrolet Caprice
1987 Chevrolet Cavalier
1987 Chevrolet Celebrity
1987 Chevrolet Corsica
1987 Chevrolet Corvette
1987 Chevrolet El Camino
1987 Chevrolet Impala
1987 Chevrolet Malibu

Select a row to view photo.

Picture



Double-click picture to enlarge

Description
left front can

It Failed. Now What?

- Tester has built-in manual mode with audio feedback
 - Can be used with gas analyzer & soapy water/spray bottle to locate leaks
 - Visual check for leaks
- Leaks
 - loose, cracked tubing & filler neck coupling
 - cracked or missing component
 - perforated tank or sending unit o-ring

Manual Mode Video

- Pressurizes to $\frac{1}{2}$ psi (14 inches of water)
- Beeps faster for large leak & slower for small leak
- Crimp hose sections to isolate leak location
- Use BAR97 to sniff for hydrocarbons
- Use soapy water to locate leak

Manual Mode Video

Fact Sheet

- 5.2 Million 1976-1995 vehicles smog tested in 2005
- 10.6% estimated failure rate based upon roadside and Alpha studies
- Approximately $\frac{1}{2}$ million vehicles will fail the low fuel evaporative test annually (2005 implementation)
- Test time depends on crimp location and tank vapor space
 - Average test time is about 8 minutes
 - Production unit software may cut tester decision time by 1-2 minutes
 - Large tank volumes > 25 gallons or high temperatures may take about 11 minutes

Fact Sheet (continued)

- \$161 Average repair cost per ARB
 - Ave. Smog labor rate \$74/hr.
- Tester cost \$2000-3000
 - 2 manufacturers have submitted equipment to BAR
 - 1 year warranty

What Happens Next?

- Written comments to BAR by May 15, 2006

Bureau of Automotive Repair

Attn: LPFET Workgroup

10240 Systems Parkway

Sacramento CA 95827

- BAR/ARB to consider industry comments when developing regulations
- BAR to certify evaporative test equipment after regulations adopted

Summary

- California has a commitment to air quality
- These workshops are to solicit your input on how to move forward with implementation and for comments on things we may have overlooked.

Questions and Answers